

REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

Claims 5 and 6 have been canceled and the subject matter thereof has been incorporated into Claim 1. Claim 2 has been rewritten in independent form, as have allowable Claims 3, 4 and 7. New Claims 9-11 correspond to Claim 8 except for their dependency. New Claims 12-13 correspond to Claims 1-2 except that they recite that the claimed parameters are “predetermined” rather than “set.” Basis for this is found in the use of the word “set” in the original claims and in the fact that the claimed parameters are for the rod target as manufactured, and not after erosion during use (note, e.g., the “initial volume” in Table 1).

According to a feature of the invention set forth in all of the claims, a rod target for an arc evaporation source is formed to have opposite ends which are formed thicker than the central part of the target. Table 1 on page 17 of the specification provides evidence that the length of this larger diameter portion is critical for improved consumption efficiency. Specifically, Table 1 provides evidence that the consumption efficiency increases where the length of the larger diameter portion is made to be 75 mm or more, and then begins to decrease for larger diameter lengths made to be greater than about 125 mm. Thus, there is an unexpected peak in consumption efficiency for rod targets made to have thicker end portions in the range of 75 to 200 mm.

Claim 2 recites that the length of the thicker portion at each of the opposite ends of the rod target in the longitudinal direction of the rod target “is set” to be not less than 75 mm not more than 200 mm. Claim 2 thus recites a rod target having certain “set” dimensions. New Claim 13 recites that these dimensions are “predetermined.” Claim 2 was rejected under 35 U.S.C. § 103 as being obvious over JP ‘617 which discloses a cathode rod which is made to be cylindrical but which can become worn or eroded during use to assume the

configuration of Figure 3 wherein the rod is tapered at its mid-portion. The Examiner has recognized that there is no description in JP '617 that the thicker portions at the end of the worn rod will have a length of between 75 and 200 mm but alleges that this length would have simply comprised the discovery of an optimum value. However, it is respectfully submitted that this rejection is flawed for at least two reasons.

First, Claim 2 recites that the claimed length is "set." Similarly, new Claim 13 recites that this dimension is "predetermined." The claimed length for any larger diameter portion in JP '617, on the other hand, is never "set" or "predetermined" but may only occur randomly due to erosion. This difference does not arise in a process limitation which can be ignored in an apparatus claim since it affects the structure of the rod target; a rod target in which the length of the thicker portion is "set" or "predetermined" to be in the claimed range will be structurally different from one which is not so set or predetermined, for example a thickness difference occurring due to erosion may be rough and uneven about the circumference of the rod target. Thus the "set" or "predetermined" limitations must be considered by the Examiner. MPEP § 2113; *In re Garnero*, 162 USPQ 221 (CCPA 1979).

Second, the claimed set or predetermined length dimension of between 75 and 200 mm cannot be dismissed as being the obvious result of routine experimentation to discover an optimum value, because the claimed range provides unexpectedly improved results.

M.P.E.P. § 2144.05(III). Evidence of unexpectedly improved results is present in Table 1 which indicates the presence of an unexpected "peak" in the consumption efficiency of the rod for the claimed set length of the larger diameter portion. Claims 2 and 13 therefore clearly define over JP '617.

Claim 6, whose subject matter has now been incorporated into Claim 1, was rejected under 35 U.S.C. § 102 as being anticipated by JP '617. Claim 6 further recited a particular range of angles for the tilt angle of the taper portion. This range minimizes thermal stresses

and so can prevent cracking (see page 12). Paragraph 14 of the Office Action states that the claimed tilt angle of between 3 and 30° would inherently occur at some point during the erosion of the rod of JP '617 since the rod is initially cylindrical and ultimately assumes a taper such as is shown in Figure 3. However, even if this were true, the rod of JP '617 would not exhibit a tilt angle which is "set" to be between 3 and 30° ("predetermined," in the case of new Claim 12). Since any taper in the rod of JP '617 is the result of erosion, it is not predetermined in any way and so is not "set" to any particular angle. Amended Claim 1 and new Claim 12 therefore also define over this reference.


The claims have been amended in light of the rejection under 35 U.S.C. § 112, which is believed to be moot.

Figure 12 has been amended as required in paragraph 1.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

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IN THE DRAWINGS

Please replace the sheet of drawings containing Figure 12 with the attached replacement sheet in which the leftmost reference numeral "53" is changed to "52".

Attachment: Replacement Sheet